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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/639,259	08/15/2000	Helen H. Kim	Kim 6-8	1586

22186 7590 03/17/2004

MENDELSON AND ASSOCIATES PC  
1515 MARKET STREET  
SUITE 715  
PHILADELPHIA, PA 19102

EXAMINER

AHN, SAM K

ART UNIT PAPER NUMBER

2634

DATE MAILED: 03/17/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

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**Office Action Summary**

Application No.

09/639,259

Applicant(s)

KIM ET AL.

Examiner

Sam K. Ahn

Art Unit

2634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on amendment, received on 11/24/03.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 18-20 is/are rejected.
- 7) ☒ Claim(s) 16 and 17 is/are objected to.
- 8) ☒ Claim(s) 21 and 22 are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1. The inventions are distinct, each from the other because of the following reasons:

This application contains claims directed to the following patentably distinct species of the claimed invention:

Claims 1-20 are directed to species of configuration in Fig.2.

Claims 21 and 22 are directed to species of configuration in Fig.3.

These configurations are independent and distinct from each other.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, no claims are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added.

An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

2. Applicant's election with traverse of claims 1-20 over the telephone conversation on 1/29/04 with Mr. Steve Mendelsohn, Reg. No. 35,951 is acknowledged.
3. Claims 21 and 22 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim.

#### ***Response to Arguments***

4. In regards to the prior art rejection for claim 1, the Examiner maintains the position that Shiokawa does teach the limitation claimed. As explained below in 112 rejection, the claim is not supported by the specification nor the drawing, and therefore the Examiner interprets the claim as a comparator receiving a signal. Noting the explanation above, applicants' argument of Shiokawa not teaching the limitation of the comparator receiving the received signal and the estimated signal is not persuasive.

Applicants further argue that Shiokawa does not teach the limitation of "*to model the transmission channel to generate an estimated signal corresponding to one of the data levels*". Shiokawa does teach modeling the transmission channel to generate an estimated signal (outputs of 35~39) corresponding to one of the data levels ( +1.5, +1, 0, -1 and -1.5). These components are part of a maximum likelihood estimator (2 in Fig.1).

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1-13 and 18-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In response to the applicants' argument to the 112 rejection, the Examiner maintains the same position for claim 1. The applicants have responded that the specification supports the claimed limitation of "a comparator receiving the received signal and the estimated signal from each channel estimator".

However, from Fig.2 and the specification, the subtraction nodes (215 and 216 in Fig.2) receive the received signal and the estimated signal, and not the comparator

(217). What the comparator receives is the difference of the received signal and the estimated signal. Can the comparator differentiate between the received signal and the estimated signal when only a single signal is received from each channel estimator? (for example, signal from output of 215) The specification recites in p.3, line 20, "*the two resulting difference signals are compared at compare-and-select module 217*". And therefore, it is not the received signal and the estimated signal that is received by the comparator.

Furthermore, if one were to draw into a figure of the recited claim 1, two inputs would be connected to the comparator (received signal <Vin> and estimated signal <output of 213>) from each channel estimator. However, only one input <output of 215> is coupled to the comparator from each channel estimator.

Therefore, the specification nor the drawing supports the claimed limitation of "*a comparator configured to receive the received signal and the estimated signal from each channel estimator*" to reasonably convey to one skilled in the art.

Claims 2-13 and 18-20 directly or indirectly depend on claim 1.

### ***Claim Objections***

6. Claim 11 is objected to because of the following informalities:

In claim 11, line 2, the Office suggests replacing "--- the two or more data levels ---" with "--- two or more of the data levels" for clarity ---".

Appropriate correction is required.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1, 2, 4, 14 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Shiokawa (Shiokawa).

Regarding claims 1 and 14, Shiokawa discloses method and apparatus of a receiver (see Fig.1) for a received signal having two or more data levels, a multilevel signal (note Abstract), the received signal having been transmitted over a transmission channel where further comprising two or more channel estimators (30~34 in Fig.1), at least one channel estimator for each different data level for the received signal (having five different data levels, +1.5, +1, 0, -1 and -1.5 in 35~39 in Fig.1) each channel estimator being configured to model the transmission channel to generated an estimated signal (ouputs of 35~39) corresponding to one of the data levels (+1.5, +1, 0, -1 and -1.5), and a comparator (5) configured to receive the *signals from the channel estimators* and select and output data level for the received signal. (note col.4, lines 10-52)

Regarding claims 2 and 15, Shiokawa teaches all subject matter claimed, as applied to claim 1 or 14. Shiokawa further teaches wherein each channel

estimator implements a 2<sup>nd</sup> order model of the transmission channel. (see 35~39 in Fig.2)

Regarding claim 4, Shiokawa teaches all subject matter claimed, as applied to claim 2. Shiokawa further discloses wherein each channel estimator (30~34) comprises a processing path for each order term (35~39) in the model of the transmission channel.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shiokawa (Shiokawa).

Regarding claim 13, Shiokawa teaches all subject matter claimed, as applied to claim 1. Shiokawa further teaches wherein the transmission channel is an optical transmission channel as the receiver used in receiving signals from an optical discs. (note col.1, lines 9-14) Although Shiokawa does not explicitly disclose the receiver configured in a single integrated circuit as analog circuitry, this would have been a matter of design choice. One skilled in the art may determine to



integrate certain number of functional circuitry in an integrated circuit and may determine to do so in another integrated circuit and connect the two circuits, or may determine to combine the two into one single integrated circuit. This may all be decided by market demand, cost of production, level of difficulty in producing, and so on. Therefore, it would have been obvious to one skilled in the art at the time of invention to integrate all the functional circuitry into one integrated circuit as it is a matter of design choice in producing the receiver.

***Allowable Subject Matter***

3. Claims 3, 5-12 and 18-20 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, first paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.
4. Claims 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
5. The following is a statement of reasons for the indication of allowable subject matter:  
Present application discloses an apparatus and a method in a receiver comprising two channel estimators coupled to an adaptive equalizer wherein the input signal having two or more data levels is subtracted by an estimated signal to determine the received signal. Each channel estimators are coupled to a comparator to select an

output data level for the received signal. Closest prior art, Shiokawa teaches all subject matter recited above. However, Shiokawa does not teach the further limitation of generating an error signal by the comparator to control the adaptive model of the transmission channel. Shiokawa further does not teach adaptive equalizers receiving an ideal data level corresponding to one of the data levels in generating an input signal for channel estimators. Therefore, prior art does not teach or suggest the further limitations claimed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Sam Ahn** whose telephone number is **(703) 305-0754**.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Stephen Chin**, can be reached at **(703) 305-4714**.

**Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks  
P.O. Box 1450  
Alexandria, VA 22313-1450

**or faxed to:**

**(703) 872-9306**


Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Sam K. Ahn  
2/10/04



**STEPHEN CHIN**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**